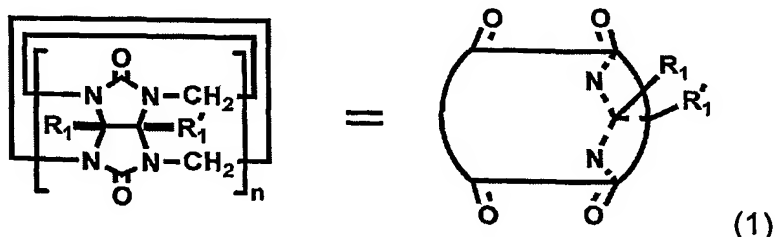
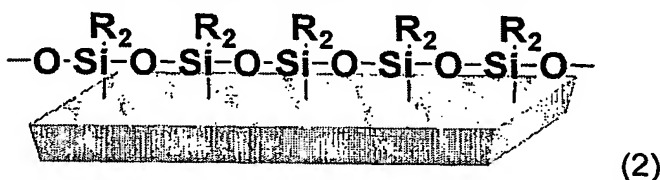


## CLAIMS

1. A cucurbituril derivative-bonded solid substrate in which a cucurbituril derivative of Formula 1 below is covalently bonded to a modified solid substrate of Formula 2 below:



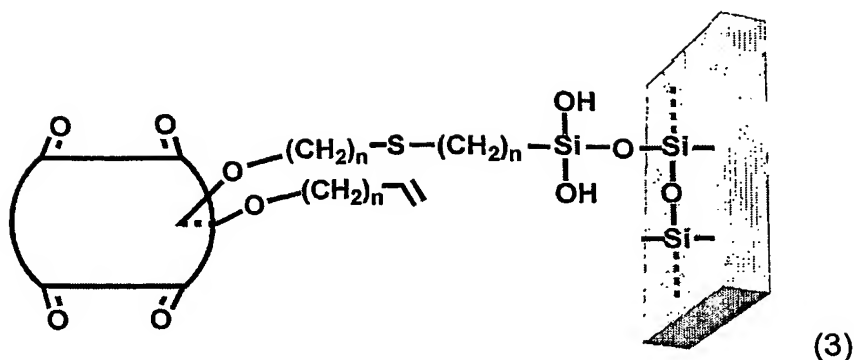
wherein  $n$  is an integer of 4 to 20, and  $R_1$  and  $R_1'$  are each independently an alkenyloxy group with an unsaturated bond end and a substituted or unsubstituted alkyl moiety of  $C_1$ - $C_{20}$ , a carboxyalkylsulfinyloxy group with a substituted or unsubstituted alkyl moiety of  $C_1$ - $C_{20}$ , a carboxyalkyloxy group with a substituted or unsubstituted alkyl moiety of  $C_2$ - $C_8$ , an aminoalkyloxy group with a substituted or unsubstituted alkyl moiety of  $C_2$ - $C_8$ , or a hydroxyalkyloxy group with a substituted or unsubstituted alkyl moiety of  $C_2$ - $C_8$ , and



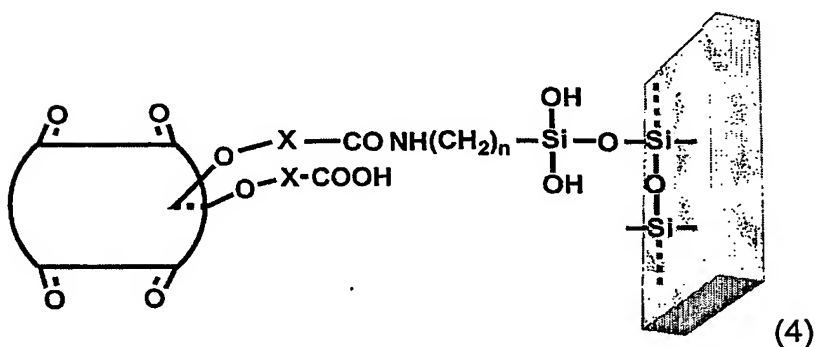
wherein  $R_2$  is an alkyl group of  $C_1$ - $C_{10}$  with an end functional group selected from thiol, amine, epoxy, isocyan, and isothiocyan.

2. The cucurbituril derivative-bonded solid substrate of claim 1, wherein the solid substrate is a glass, a silicon wafer, an indium tin oxide (ITO) glass, an aluminum oxide substrate, or a titanium dioxide substrate.

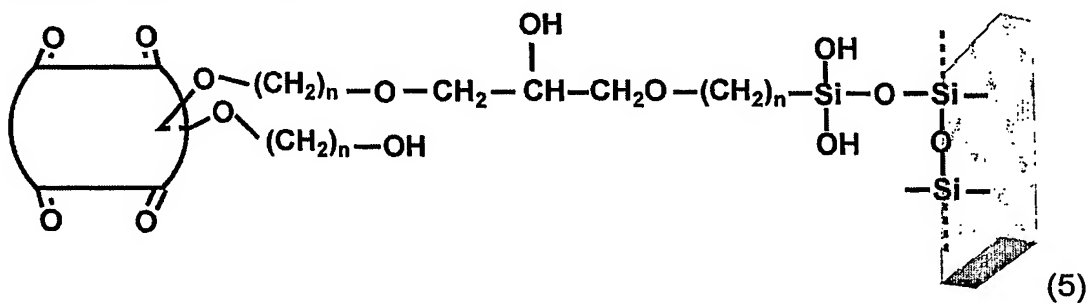
3. The cucurbituril derivative-bonded solid substrate of claim 1, which is one selected from substrates represented by Formulae 3 through 6:



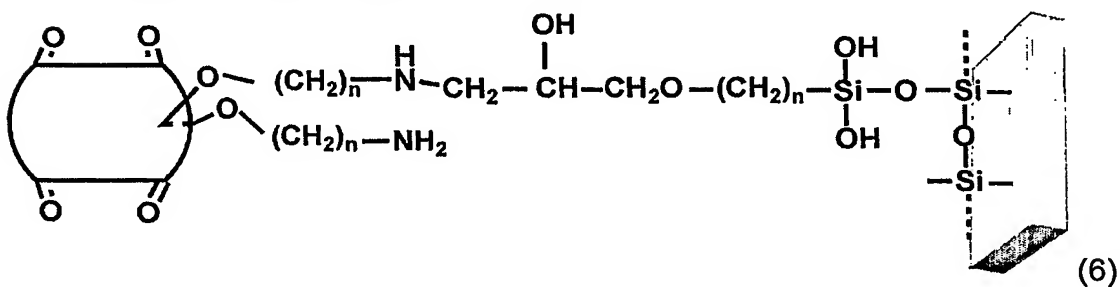
wherein each n is independently an integer of 1 to 20;



- 5 wherein n is an integer of 1 to 20 and X is a dialkylsulfide group with a substituted or unsubstituted alkyl moiety of C<sub>1</sub>-C<sub>20</sub> or a substituted or unsubstituted alkyl group of C<sub>1</sub>-C<sub>20</sub>;

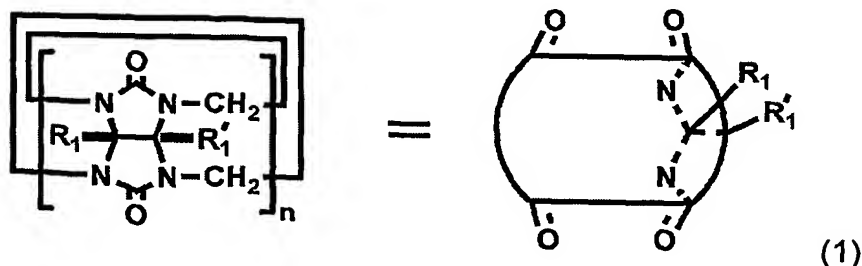


wherein n is an integer of 1 to 20; and

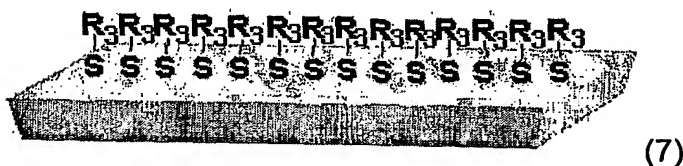


wherein n is an integer of 1 to 20.

4. A cucurbituril derivative-bonded solid substrate in which a cucurbituril derivative of Formula 1 below is covalently bonded to a modified solid substrate of Formula 7 below:



5 wherein  $n$  and  $R_1$  are as defined in claim 1, and

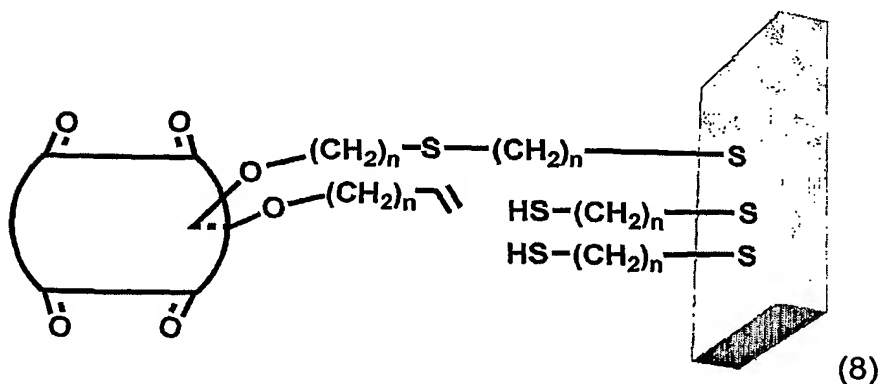


wherein  $R_3$  is an alkyl group of  $C_1$ - $C_{10}$  with an end functional group selected from thiol, amine, epoxy, isocyan, and isothiocyan.

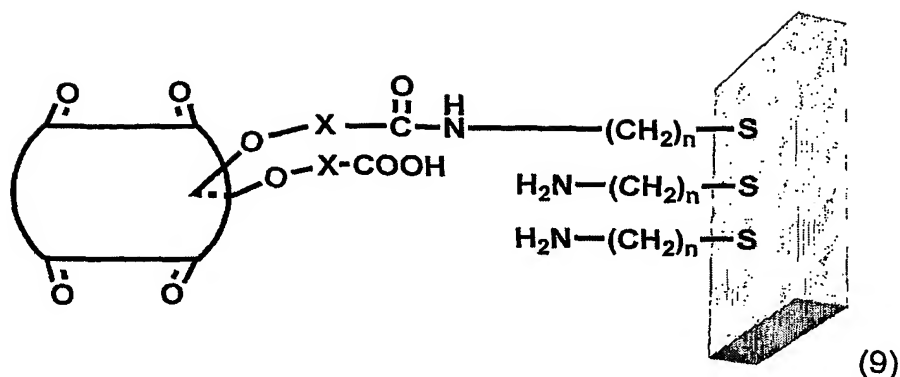
10 5. The cucurbituril derivative-bonded solid substrate of claim 4, wherein the solid substrate is a substrate made of gold, silver, platinum, or copper.

6. The cucurbituril derivative-bonded solid substrate of claim 4, which is one selected from substrates represented by Formulae 8 through 11:

15

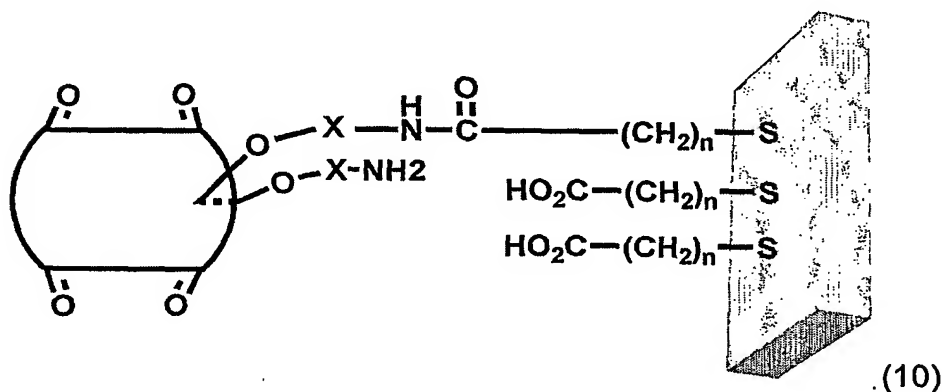


wherein each  $n$  is independently an integer of 1 to 20;

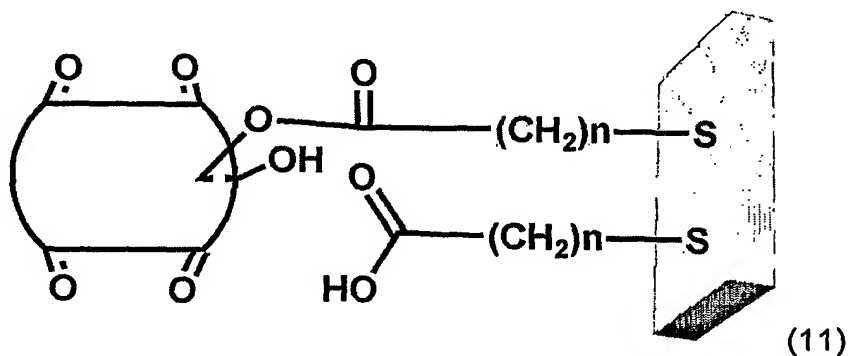


wherein each  $n$  is independently an integer of 1 to 20 and  $X$  is a dialkylsulfide group with a substituted or unsubstituted alkyl moiety of  $C_1$ - $C_{20}$  or a substituted or unsubstituted alkyl group of  $C_1$ - $C_{20}$ ;

5



wherein each  $n$  is independently an integer of 1 to 20 and  $X$  is a dialkylsulfide group with a substituted or unsubstituted alkyl moiety of  $C_1$ - $C_{20}$  or a substituted or unsubstituted alkyl group of  $C_1$ - $C_{20}$ ; and



wherein each  $n$  is independently an integer of 1 to 20.

7. A protein chip comprising the cucurbituril derivative-bonded solid substrate of any one of claims 1 through 6.

8. A gene chip comprising the cucurbituril derivative-bonded solid substrate of any one of claims 1 through 6.

5 9. A sensor for biomaterial assay comprising the cucurbituril derivative-bonded solid substrate of any one of claims 1 through 6.